TSCOPE: Real-time Mobile Data Collection Technology Using Spatiotemporal Data Casting

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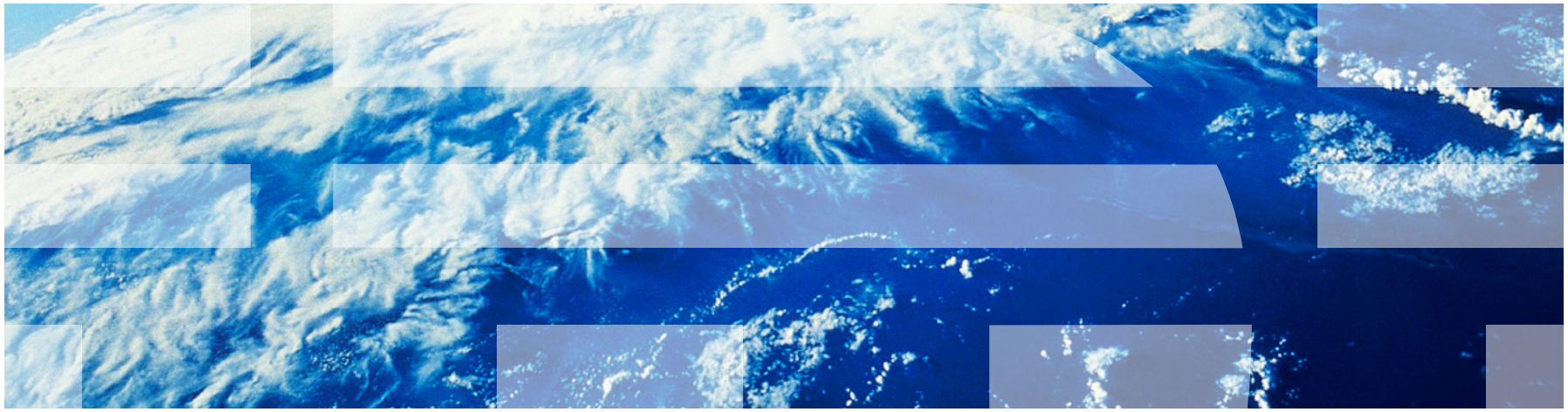

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Natural disaster like Sandy disrupts the communication infrastructure in a major way

- With power outage, also gone are
  - Wireless at home
  - TV
  - Radio
- People used
  - Cell phones
  - Car stereos
  - Hot spots
- To connect with rest of the world
  - Voice calls
  - Web access (facebook!)
  - News

**Individual experience may vary*

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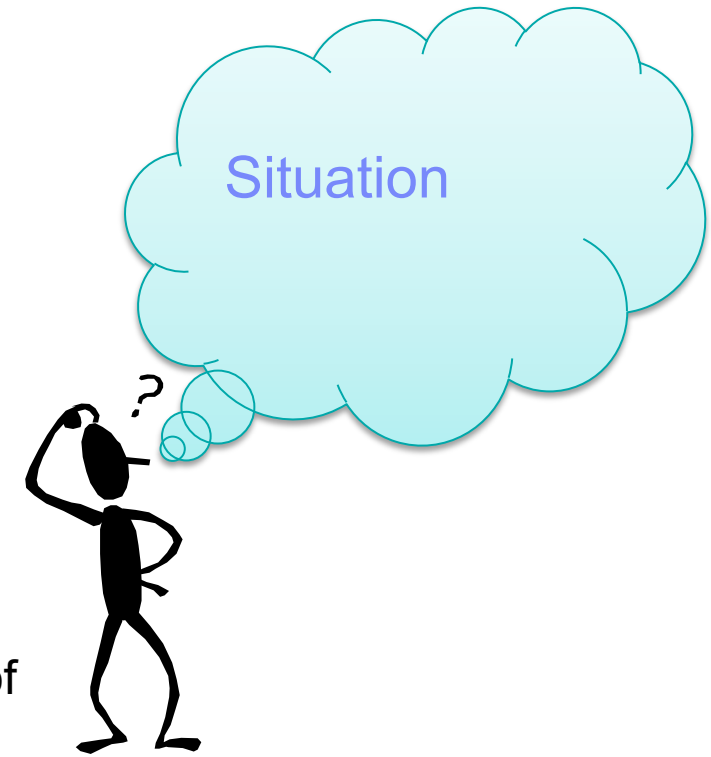
However, it is difficult to gain *situation awareness*

- ***Situation Awareness (SA)***
  - Knowing what is going on so you can figure out what to do (Adam, 1983)

- General public
  - News is too generic
  - Voice call is for close family and friends
  - Websites are not up to date

- Same for government, city, aid workers
  - Lack of useful source of information

- How can we know the current situation of *a specific area of interest*?



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Consider a scenario…

- Government agency is trying to assess the flooding situation in a certain area
  - By collecting data & evidence, e.g., text messages, pictures from people in the affected area

- Ideally, the agency should be able to send a query to mobile phones owned by the people in the affected area
  - *Without* knowing who they are and where they are

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TSCOPE is …

- A real-time mobile data collection service that allows
- Sending *location-oriented* queries to users to get SA data
- *Without requiring knowledge* of the contact information of the recipients and their whereabouts

- TSCOPE leverages the power of crowdsourcing to create some sort of a *real-time Google street view*

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A little more detail

- Spatial data cast
  - Sends text-based queries to mobile devices in a particular region (Garment district), near point of interest (near Rockefeller Center), trajectory, etc.
  - Data cast is controlled by policy to ensure only relevant recipients are reached
  - Recipients responds with text, image, video, audio, etc.

- Semantic enrichment
  - Translate human friendly names into geocodes
  - Location-based query (e.g., situation near Union Station, City Hall)
  - Personalized search (e.g., images near my home, work)

- Storage and feedback
  - Store and cache previous search results for repeat queries
  - Rank results based on various attributes, user feedback

- Temporal aspects in spatiotemporal
  - Query for specific time duration (past, future)

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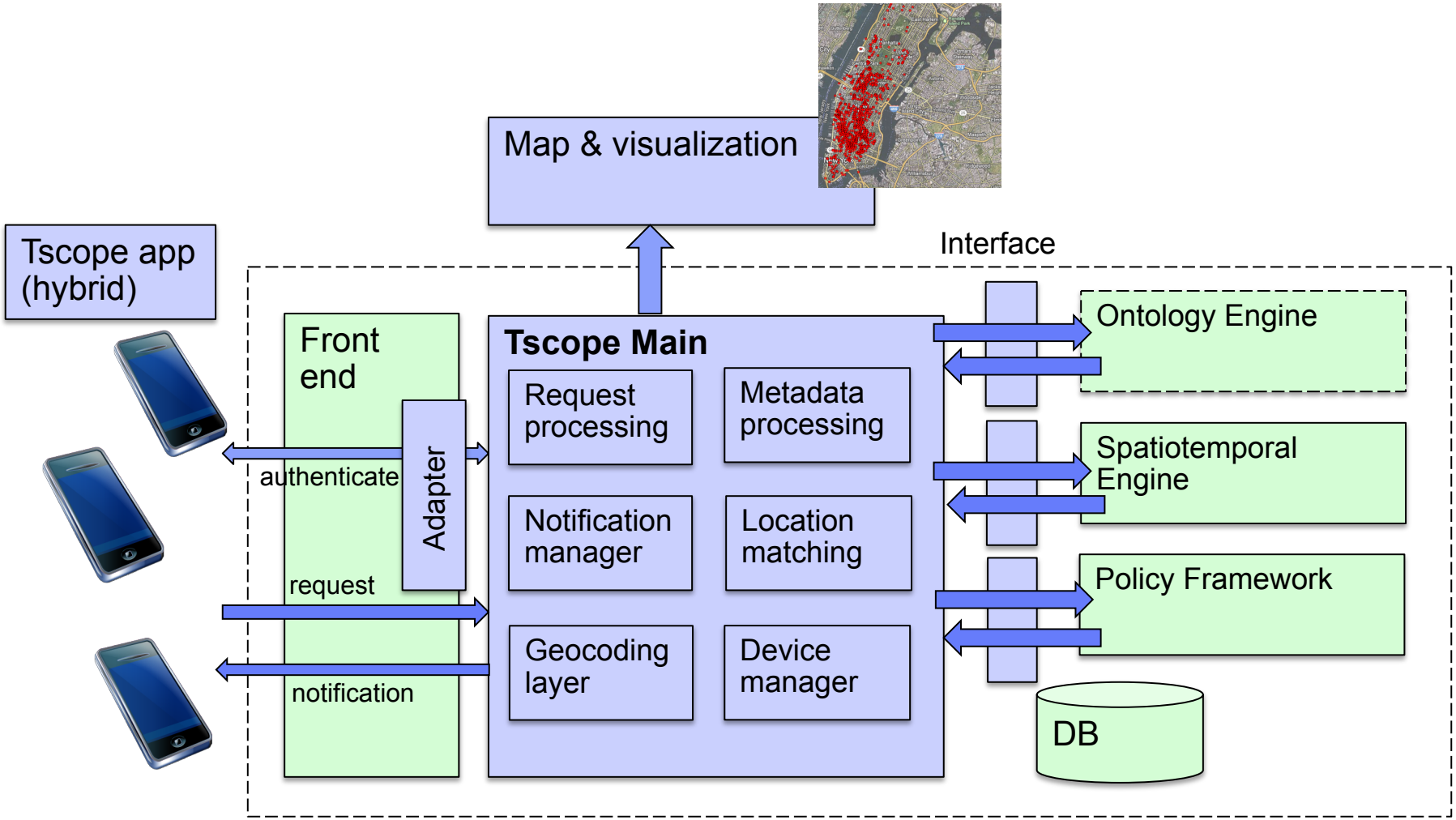
TSCOPE Service Architecture



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